

Monday, with zero temperature accompanied by winds with almost hurricane force, a velocity of 76 miles an hour being reached February 1. These conditions have called for special caution on the part of shippers of perishable goods, railroads, and the traveling public; and the warnings from the Weather Bureau have amply served to prepare all concerned for the changes in advance of their coming. Each important characteristic of weather conditions has been heralded at least thirty-six hours in advance, thereby saving much property and probably many lives. * * The local Weather Bureau office has performed a signal service during the past severe weather. Its predictions of the big storms of last week and this have been well worth all the Bureau costs in a year.

The third barometric depression of the month moved slowly from the Pacific to the Atlantic coasts from the 8th to 15th, attended by mild temperature and heavy rains that resulted in floods in the central valleys and the Eastern States. Crossing the Canadian Maritime Provinces during the 16th this depression entered an extensive low barometer area that covered the higher latitudes of the north Atlantic Ocean from the 18th until the close of the month. During the passage of this disturbance over the interior of the United States tornadic storms were reported on the 14th in Texas and Mississippi, and severe windstorms were experienced on the Lakes and Atlantic coast during its passage over the eastern districts. From the 16th to 20th a disturbance crossed the American Continent, attended by heavy snow and gales from the upper Mississippi Valley eastward, and followed by a moderate cold wave that carried the line of frost to the middle Peninsula of Florida. From the 23d to 26th a barometric depression advanced from the British Northwest Territory to the Atlantic coast with general precipitation from the Rocky Mountains eastward and gales on the Great Lakes and the Atlantic and Gulf coasts. This depression was followed by a cold wave that produced the lowest temperatures of the season in southeastern Florida, freezing temperature being reported in Dade County on the 28th.

During the closing days of the month barometric pressure decreased over the western portion of the United States, and by the 29th unsettled weather had set in generally thruout the central valleys and thence westward to the Pacific coast.

BOSTON FORECAST DISTRICT.*

[New England.]

The month as a whole was cold and stormy. The coast was swept by several severe storms, the most severe of which was the one of the 6-7th. There was considerable snow in the first decade, and the minimum temperatures of the month occurred generally on the 5th. While there was much delay and inconvenience to shipping from stress of weather, there was no great damage to vessels or to shore property.—*J. W. Smith, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.*

[Louisiana, Texas, Oklahoma, and Arkansas.]

Precipitation was generally excessive and temperature as a rule above the normal. No extensive cold wave occurred and no general storm visited the Gulf coast. Frost or freezing temperature warnings were issued for all injurious temperature conditions.—*I. M. Cline, District Forecaster.*

LOUISVILLE FORECAST DISTRICT.*

[Kentucky and Tennessee.]

The month was stormy, with an excess of precipitation and no very cold weather. Cold-wave warnings were ordered on the 1st in advance of the cold weather of the first three days, when the lowest temperature of the month occurred.—*F. J. Walz, District Forecaster.*

CHICAGO FORECAST DISTRICT.*

[Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, and Montana.]

No sweeping cold waves occurred. Advisory messages for high winds were issued to open ports on Lake Michigan. No Lake casualties have been reported. The principal feature of the weather conditions in the district was the occurrence of

heavy rains and snows attending the movement of four different storms, the most severe of which occurred in the latter part of the second decade of the month. Warnings were issued in advance of these storms as far as possible, and it is thought that the forecasts were of great service.—*H. J. Cox, Professor and District Forecaster.*

DENVER FORECAST DISTRICT.*

[Wyoming, Colorado, Utah, New Mexico, and Arizona.]

There were a few cold snaps of brief duration and heavy snowfalls of a local character, but the prevailing weather was fine.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.†

[California and Nevada.]

The month as a whole was one of pleasant weather, with a normal amount of rain. During the middle of the month the weather was generally clear and pleasant owing to the existence of a marked high area. Some moderately heavy frosts occurred and ample warnings were issued in all cases. The month closed with a severe storm.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND, OREG., FORECAST DISTRICT.†

[Oregon, Washington, and Idaho.]

The month was unusually quiet and only two storms of note crossed the district, one on the 5th and the other on the 26th. Timely warnings were issued. No cold waves occurred.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

Winter and spring storms from the southwest that move northeastward from New Mexico and Texas thru the Ohio Valley, the lower Lake region, and the St. Lawrence Valley are usually attended by heavy rains and abnormally high temperatures over the east and south quadrants. These rains almost invariably cause severe floods in the rivers, particularly in the Ohio and its tributaries, and they are frequently much increased in magnitude by the additional volume of water from the melting of the snows that have accumulated since the last thaw. In fact it often happens that the melting of the accumulated snow contributes more to the flood volume than does the rainfall resulting from the storms.

The storm of February 13-16, 1908, was no exception to the general rule. On the night of February 10 there were from 3 to 18 inches of snow over the upper Ohio watershed with a water equivalent of about 20 per cent of the actual depth, the greatest amount being over the Allegheny River watershed. This snow began to melt on the 12th, under the influence of warm southerly winds caused by a depression to the northwestward, and preliminary advices were issued on that day from the Central Office at Washington to the effect that warm rains would cause rapid melting of the snows over the upper Ohio Valley and the Middle Atlantic States with a probability of high waters and the breaking up of ice.

Specific warnings from the district centers began on the 13th and 14th, and during the 15th they were extended to the Atlantic coast.

To give in detail the history of the floods would simply mean a repetition of the history of past floods with the single, altho extremely significant, exception that never before had a flood of such magnitude prevailed over the Ohio Valley without loss of human life, and with so little loss and damage to property. It was freely admitted in this connection that this happy condition of affairs had been made possible by the timely and accurate warnings of the Weather Bureau. Practically nothing movable was damaged, but the damage to what could not be moved amounted to several millions of dol-

* Morning forecasts made at district center; night forecasts made at Washington, D. C.

† Morning and night forecasts made at district center.

lars, Pittsburg alone suffering to an amount variously estimated at from one to three millions.

Flood stages were first reached on the lower Mississippi on the 21st, but at the end of the month the flood line had not been reached at Greenville, Miss., while the crest had just past New Madrid, Mo.

Following are the flood and crest stages at the various stations of observation from Pittsburg to Cairo, with the dates of the crests:

Station.	Flood stage.	Crest stage.	Date.
	<i>Feet.</i>	<i>Feet.</i>	
Pittsburg, Pa.....	22	30.7	16
Beaver Dam, Pa.....	27	41.3	16
Wheeling, W. Va.....	36	42.8	17
Parkersburg, W. Va.....	36	41.2	18
Point Pleasant, W. Va.....	39	45.7	19
Huntington, W. Va.....	50	48.1	19
Cattlettsburg, Ky.....	50	49.2	19
Portsmouth, Ohio.....	50	50.9	19
Maysville, Ky.....	50	48.9	20
Cincinnati, Ohio.....	50	51.3	20
Madison, Ind.....	46	41.5	21
Louisville, Ky.....	28	24.7	21
Evansville, Ind.....	35	40.9	23, 24
Mount Vernon, Ind.....	35	41.3	25
Paducah, Ky.....	40	40.9	26
Cairo, Ill.....	45	44.9	26

The Wabash River reached a stage of 18.9 feet at Terre Haute, Ind., on the 20th, 2.9 feet above flood stage, and 23.2 feet at Mount Carmel, Ill., on the 24th, 8.2 feet above flood stage. Excellent warnings were also issued for the interior rivers of Ohio, and they were of great value to all concerned.

No damage of consequence was caused by the flood in the Illinois River, altho the crest stages were from 3 to 7 feet above the flood line. Warnings were issued on the 13th and 14th.

Nearly all of the rivers of the Middle Atlantic States and New England were in flood on the 16th and 17th, accompanied by the breaking up of the ice, but as warnings had been given a few days in advance, the damage was reduced to a minimum.

Flood stages also occurred in most of the rivers of the South Atlantic and east Gulf States, but without unusual incident, as warnings were issued at the proper time. These warnings were of special value to the cattle and lumber interests. The greatest rises occurred in the rivers of Alabama.

By the end of the month normal conditions had been resumed, except in the lower Ohio, lower Mississippi, Illinois, and Wabash rivers, where high stages continued.

On February 4 the first warning was issued for the Gila River of Arizona, and altho no flood was anticipated, the warnings of a moderate rise in the lower river were of value.

ICE.

At the end of the month the Mississippi River was frozen over almost as far south as Davenport, Iowa, which was about the southern limit at the end of February, 1907. It had been frozen over as far as Hannibal, Mo., but opened on the 14th at Davenport, on the 25th at Muscatine, Iowa, and on the 12th at Hannibal. Floating ice was observed early in the month as far south as New Madrid, Mo.

The Missouri River remained closed as far down as Sioux City, Iowa, and for some distance below. It had been closed at Omaha, Nebr., but opened on the 12th. There were occasional gorges below early in the month, and navigation in and

out of Hermann, Mo., was suspended from the 1st to the 10th inclusive.

The Ohio River remained open, altho floating ice was frequently observed during the first half of the month.

The middle Atlantic and New England rivers were generally frozen at the beginning of the month, but the thaw of the 13th and 14th broke up the ice except in eastern New England.

The southernmost point from which ice was reported was Weldon, N. C., on the Roanoke River, where floating ice was observed from the 3d to the 6th, inclusive.

SNOW.

The following information has been condensed from the snow bulletins issued in the Western States, where the water supply for irrigation purposes is dependent upon the amount of run-off from melted snow.

Arizona.—There was much more snow than the combined fall of the two previous months; the snow is well packed, and the prospects of a plentiful water supply are now very favorable.

Colorado.—Over the northern watersheds the snowfall was deficient, but over the southern portion it was, as a whole, in excess of the normal amount. Conditions appear to indicate an early flow of water, with a deficient supply over the central and northern portions of the State.

Idaho.—The greater portion of the snow fell over the northern end of the State, where the fall had hitherto been deficient. The snow is compact, and an average flow of water is indicated, except in the Wood, Boise, and Salmon River districts.

Montana.—Altho there was a material increase in the snowfall, the flow of water for navigation and mining purposes will be inadequate.

Nevada.—There was a general increase in the depth of accumulated snow, but without exceptionally favorable conditions in March, the flow of water will be deficient.

New Mexico.—Conditions on the whole are fairly favorable, except over the Canadian watershed, and the extreme southwestern portion of the territory.

Utah.—While the snowfall for February was deficient, yet that left on the ground is well packed and prospects of a good water supply are favorable. The lakes and streams are high for the season.

Oregon.—There is much less than the usual amount of snow on the ground, owing both to deficient supply and the excess of rain. The run-off will consequently be less than usual.

California.—A good supply of water is indicated.

Washington.—The winter snow has thus far been deficient, and the flow of water will probably fail to meet all requirements.

Wyoming.—The snowfall of the month was light, but what remains is well packed, and a good supply of water is indicated, except possibly over the eastern slope of the Big Horn Mountains, where more snow is needed.

The highest and lowest water, mean stage, and monthly range at 207 river stations are given in Table IV. Hydrographs for typical points on seven principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—H. C. Frankenfield, Professor of Meteorology.

SPECIAL ARTICLES, NOTES, AND EXTRACTS.

RECENT PAPERS BEARING ON METEOROLOGY AND SEISMOLOGY.

H. H. KIMBALL, Librarian.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate

branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a —.